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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Ewsuk et al.

Examiner: Mehta, A.

Serial No.: 09/765,768

Group: 2128

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For: METHOD FOR DIE DESIGN AND POWDER PRESSING

AMENDMENT UNDER RULE 1.132

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I, the undersigned, Kevin G. Ewsuk (Declarant), hereby declare that:

1. I am an inventor of the invention described and claimed in the above-identified patent application.

2. I am a trained materials scientist/engineer, receiving a Bachelor of Science degree in ceramic engineering from Alfred University in 1980, a Master of Science degree in Ceramic Science from The Pennsylvania State University in 1982, and a Doctor of Philosophy degree in ceramic science from The Pennsylvania State University in 1986. I have been active in the specialty area of ceramic powder processing and characterization since 1980. I have specialized expertise in the area of ceramic powder compaction, a subject on which I have presented plenary and invited lectures at international

meetings in Asia, Europe, and the United States of America. I have published numerous papers on the subject including:

- a) "Ceramics (Processing)," (invited) pp. 603-33 in the Kirk-Othmer Encyclopedia of Chemical Technology, Fourth Ed., Vol. 5, John Wiley & Sons, Inc., New York, NY, 1993.
- b) "Ceramic Processing," (invited) pp. 2457-2472 in Encyclopedia of Chemical Physics and Physical Chemistry, Volume III: Applications, edited by John H Moore and Nicholas D Spencer, IOP Publishing Ltd., Philadelphia, 200; and
- c) "Powder Granulation and Compaction," (invited) pp. 7788-7800 in *Encyclopedia of Materials: Science and Technology, Vol 8* Edited by K H J Buschow, R W Cahn, M C Flemings, B Ilshner, E J Kramer, and S Mahajan, Elsevier Science Limited, Oxford, 2001.

Additionally, I have served as the Guest Editor of the December 1997 MRS Bulletin (Vol. 22 No. 12) on "Compaction Science and Technology"

3. I have lead a major research and development effort on powder compaction at Sandia National Laboratories, including a 5-year project on powder compaction involving two national laboratories and five ceramic component manufacturers. This project developed and applied computer modeling and advanced characterization technology to aid ceramic component design and press powder manufacturing. Under this effort, the industry participants, all non-experts in computer modeling, received one day of training to learn the basics of setting up and completing a finite element simulation from scratch using the traditional approach similar to that described by Carr et al. All of the participants also received training over the course of a couple of hours on how to set up and run a compaction simulation using the subject invention. After the training, all of the non-experts could set up and run a compaction simulation using the subject invention; however, none of the non experts were capable of setting up a simulation from scratch

and running a compaction simulation. This difference results from the fact that the method of Carr et al. requires expertise in defining the finite element mesh as well defining other simulation parameters, including the geometry, the powder and die material properties, and the boundary and initial conditions, while the method of the present invention involves a user-friendly computer interface that is used to easily define the geometry, the material to be pressed, and the initial conditions, while the software involved automatically defines the boundary conditions, and largely automatically generates the finite element mesh. As a result, the method of the present invention provides for quicker and more efficient design and simulation of powder compaction problems.

I further declare that all statements made herein of my own knowledge are true, and that all statements made based on information and belief are believed to be true, and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the patent application or any patent issuing thereon.



Kevin G. Ewsuk

October 27, 2004

Date

SD6641/S95450

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I certify that this paper is being transmitted by facsimile on this date to the United States Patent and Trademark Office as identified below:

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